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APPLICATION NO.	09/994,002	FILING DATE	11/06/2001	FIRST NAMED INVENTOR	Glen E. Roeters	ATTORNEY DOCKET NO.	DENSE-049A	CONFIRMATION NO.	9043
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EXAMINER

MITCHELL, JAMES M

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 10/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/994,002	ROETERS ET AL.	
	Examiner	Art Unit	
	James M. Mitchell	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-12, 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fox III et al. (U.S 5,128,831) in view of Pasch (U.S 5,821,624).
3. Fox III et al. (Fig. 1-3) discloses an IC flip chip stack (Fig. 3) comprising at least two carriers (Fig. 2, Item 11) with a first conductive pattern (12A-H) attached to rectangular thermal rings (18) that possesses longitudinal and lateral side sections with opposite top and bottom surfaces that define a thickness, with a second conductive pattern formed thereon electrically connected to the first conductive patterns via through hole (19', Column 5, Lines 44-47) and at least two IC chips (Fig.3, item 15 in Fig 1) connected to the first patterns (via flip chip; Column 4, Lines 31-36) with at least one chip circumvented by the ring and disposed between the carriers having a rectangular configuration and a transposer (21) having a rectangular configuration with a top and bottom portion and a third conductive pattern (not labeled), each said carrier defines an opposite top and bottom surface with the first pattern comprising a first set of carrier pads (circular portion of pattern closest to chip shown in Fig. 2, 14) a second set of pads

(circular portion of pattern closest to chip, Fig. 2., 16) electrically connected to the first set (via "trace", 12A-H), and a third set of inherent carrier pads formed on the bottom of said carrier (Fig. 3, not labeled), said chip disposed on the top surface and electrically connected to some of the carrier pads (shown in Fig. 2) with the second and third set connected to the second conductive pattern on a ring, the third conductive pattern comprises a first set portion connected to the bottom carrier's third pad, which is connected to the second and first pattern via through holes (Abstract) along the same identical pattern, connected to a second set of transposer pads (via pad in contact with transposer), the transposer and carriers defining opposed pairs of longitudinal and lateral peripheral edge segments wherein the transposer pads (as understood to mean a pad on a transposer) of the first set extend along a longitudinal and lateral peripheral of the layer, said chip comprises a package (via the attachment chip), the ring pads extend along the longitudinal and lateral side section via the pad on the top and bottom surfaces connected by the metallized through hole (Abstract, solder), wherein each chip comprises an inherent package and is sized with the ring such that the body does not protrude beyond the top surface of said ring.

4. Fox does not show at least two rectangular flow channels forming a plurality of castellations in the walls of the ring.
5. However Pasch (Fig 10d) utilizes at least two flow channels (1012) forming a plurality of castellations within lateral walls.
6. It would have been obvious to one of ordinary skill in the art to incorporate at

least two rectangular flow channels forming a plurality of castellations within Fox's lateral portion of the ring in order to cool the device as taught by Pasch (Abstract).

7. In regard to claim 18, the limitation that the channels extend approximately to a depth one half of the ring thickness would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, that produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955)', *In re Rinehad*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976)., *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

8. Claims 13-15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fox et al. Pasch in combination with Kato (U.S 5,051,865).

9. Fox and Pasch disclose the elements stated in paragraphs 3-7, but do not show a heat sink.

10. Kato (Fig. 14) utilizes a copper heat sink (3) interposed between a chip (1) stack by an adhesive (33).

11. It would have been obvious to one of ordinary skill in the art to modify the combined structure of Fox and Pasch with a heat sink interposed between the chip stack in order to improve heat dissipation as taught by Kato (Column 1, Lines 43-44).

Response to Arguments

12. Applicant's arguments that Fox teaches away from combining flow channels is unpersuasive, while the claim that the prior art does not teach castellation have been considered but are moot in view of the new ground(s) of rejection.

13. Applicant contends that flow channel combined with Fox would change the CTE by resulting in what **applicant's believe** a non uniform amount of expansion and contraction between the carrier and ring, because the channels would cool the ring faster than the carrier base. While applicant does attempt to support his beliefs with an equation, applicant arguments are based on mere conjectures (i.e. "[a]pplicants believe", "[i]n the same line of thought", "as understood") and are found unpersuasive absent extrinsic evidence.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (703) 308-1233. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

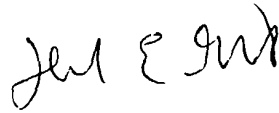
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Jmm



DAVID E. GRAYBILL
PRIMARY EXAMINER